

REMARKS

This amendment responds to the Office Action mailed on November 29, 2005. The shortened statutory period for response is set to expire on February 28, 2006. Accordingly, Applicant respectfully submits that this response is being timely filed.

Claims 1, 3-4, 6-7, 17-18 and 20-24 were pending in the present application. New claims 25-27 are submitted by the above amendments for examination on their merits. Accordingly, Claims 1, 3-4, 6-7, 17-18 and 20-27 are now pending in the present application, and Applicant believes these claims are in proper condition for allowance for the reasons set forth below.

Claim Rejections Under 35 U.S.C. § 103

The Office Action rejected claims 1, 3, 4, 6, 7, 17, 18, and 20-24 under 35 U.S.C. §103(a) as being obvious over *Eliasson* et al. (U.S. Patent 4,945,290) in view of *Ipson* (U.S. Patent 4,945,281). Applicant respectfully traverses these rejections and reconsideration is requested based on the following remarks.

The present application is directed to a dielectric barrier discharge-driven light source comprising a first electrode coupled to an outside portion of said first flat panel dielectric barrier and a second electrode coupled to said second flat panel dielectric barrier, where a plurality of stems are positioned between the first and second flat panel dielectric barriers. The stems are arranged so that they are equidistant from each other in order to provide mechanical stability and support for the dielectric barriers.

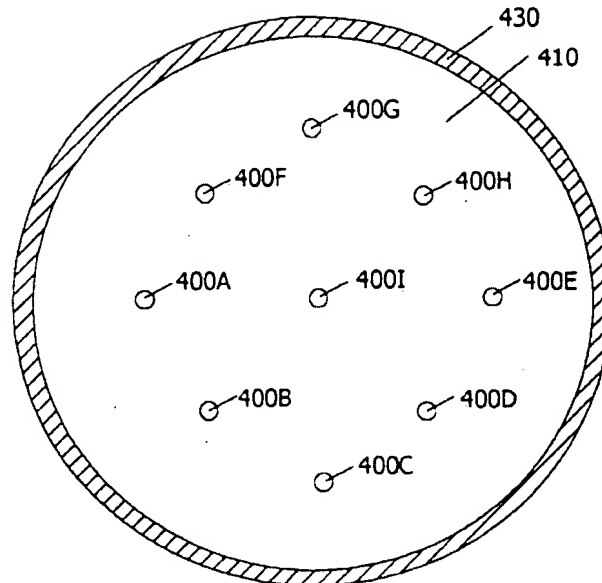
The present application describes the importance of positioning stems equidistant from one another on page 6, lines 4-13 of the present specification:

The present invention relates to DBD light sources having flat-plate, large-area panels and a system for designing such DBD light sources that withhold the mechanical stress caused during the lamp envelop cleaning (evacuation at elevated temperatures) and the pressure of final gas filling (if other than atmospheric).

One or more embodiments of the present invention place mechanical stems inside of the lamp envelope which greatly reduce the mechanical stress at the sealing surface, as well as over the entire large area panel surface. In one embodiment, the stems are arranged so that they are equidistant. This enables the mechanical stability of the lamp envelope during the cleaning (vacuum) process, as well as the filling of the lamp envelopes at other than atmospheric gas pressure. (emphasis added)

As further described on page 9, lines 10-20 of the present specification, this equidistant design of the stems enables the mechanical stability of the lamp envelope during the cleaning process which is typically performed by heating the lamp body to a temperature of about 800 degrees Celsius while evacuating the enclosed volume of the lamp envelope at less than 10^{-5} Torr. The stresses caused by this process had previously restricted DBD lamp configurations to be tube-like shapes, such as that disclosed in the second embodiment of the cited *Eliasson* reference. The equidistant stem design of the present invention equally distributes exerted stresses and also allows for the filling of the lamp envelope at pressures other than atmospheric pressure, which also restricted past DBD lamp configurations.

Referring now to Figures 4a and 4b of the present application, it can be seen that a plurality of mechanical stems 400A-400I are described where the stems are arranged equidistant from one another. For example, stem 400B is arranged to be the same distance away from stem 400A as it is from stem 400C. Further, the stems are arranged such that a distance between a combination of two of the support stems is equal to a distance between a different combination of two of the support stems. For example, the distance between stems 400A and 400B would be equal to the distance between stems 400G and 400H. This equidistant spacing equally distributes forces and reduces mechanical stresses to enable mechanical stability of the lamp envelope during the cleaning (vacuum) process, as well as the filling of the lamp envelopes at other than atmospheric gas pressure. See Figure 4b below.

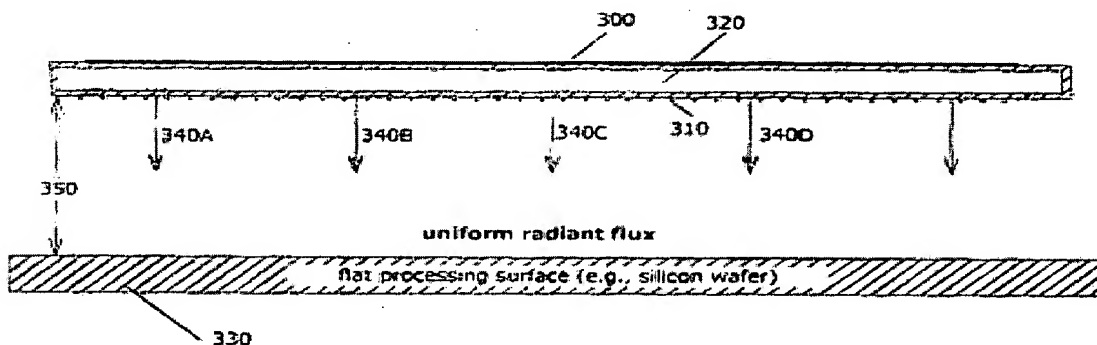
Figure 4b**head-on view of stem-stabilized flat panel,
large area DBD excimer (V)UV light source**

There is no description whatsoever within the specification of *Eliasson* that describes the spacing relationship between any of its purported stems (spacers 3, 10). In fact, it is admitted in the Office Action that *Eliasson* fails to teach or suggest arranging a plurality of stems between two dielectric barriers such that the stems are positioned equidistant from each other. *Ipson* was cited in the Office Action disclosing this feature, where Applicant respectfully traverses the asserted combination of the teachings of *Eliasson* with those of *Ipson* as set forth in the Office Action.

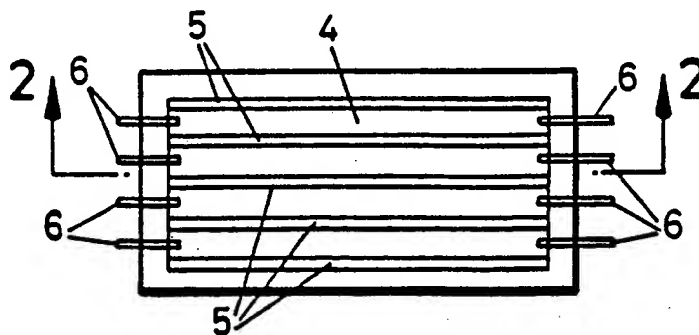
***Ipson* Fails to Disclose a Dielectric Barrier Discharge Lamp and Also Fails to Disclose Support Stems**

Ipson fails to teach a dielectric barrier discharge-driven light source in which the electrodes are coupled to surfaces of the flat panel dielectric barriers themselves. Independent Claims 1, 17 and 23 recite a “dielectric barrier discharge-driven light source” including “a first electrode coupled to an outside portion of said first flat panel dielectric barrier and a second electrode coupled to said second flat panel dielectric barrier.” The electrodes are positioned on the surfaces of the dielectric barriers themselves so that they are in close proximity to the entire discharge space but do not come into contact with the enclosed gas. One of the major advantages achieved through this

configuration is that the present invention is able to generate a uniform radiant flux, as illustrated below in FIG. 3 of the present application.

Figure 3**Flat Panel DBD (V)UV light source**

Contrarily, Ipson fails to teach or suggest a dielectric barrier discharge (DBD) light source where the electrodes are separated from the gas discharge space by the dielectric barriers themselves. Instead, the light source described in Ipson is an entirely different type of light source than a DBD light source and is similar to a conventional fluorescent bulb light source. In the Ipson light source, the electrodes [6] are positioned at the ends of the channels [4] in the sealed gas enclosure and in contact with gas in the channels [4], as illustrated in FIG. 1 of Ipson below:

**FIG. 1**

As can be seen, the *Ipson* light source is not a DBD light source where the electrodes are positioned on the outside of the dielectric barriers and where the dielectric barriers separate the electrodes from the enclosed gas. The *Ipson* light source is a completely different device from the present invention and also from *Eliasson*.

In order for the DBD light source recited in independent claims 1, 17 and 23 of the present invention to produce the desired uniform radiant flux, the electrodes must be positioned on and adjacent to the flat panel dielectric barriers, as illustrated in FIG. 3 of the present application. Clearly, *Ipson* fails to teach or suggest “a dielectric barrier discharge-driven light source” including “a first electrode coupled to an outside portion of said first flat panel dielectric barrier and a second electrode coupled to said second flat panel dielectric barrier,” as recited in the claims of the present invention. Accordingly, one skilled in the art would not be motivated to combine the teachings of *Ipson* with those of *Eliasson* or other dielectric barrier discharge technology.

Furthermore, *Ipson* also fails to teach or suggest “one or more support stems disposed between said first and second flat panel dielectric barriers. In column 4, lines 61 through column 5, line 1, *Ipson* teaches:

It will be noted from the above that it is not necessary for the spacers 9 to be sealed at their upper and lower edges to the upper and lower sheets 7 and 8. Depending upon the length, width and overall dimensions of the light source the barriers represented by the spacers between adjacent discharge channels may vary considerably. It is simply necessary to provide sufficient extensive barriers to ensure that a discharge in one channel does not prevent the initiation of a discharge in an adjacent channel. (emphasis added)

As can be seen, the entire purpose of the spacers in the *Ipson* reference are to create separate discharge channels [4] in the light source, not to provide support between the upper and lower sheets. Thus, *Ipson* does not teach or suggest that the spacers are actually coupled to the upper and lower sheets, where *Ipson* oppositely teaches that sealing the spacers to the upper and lower sheets is not necessary. In this manner, the spacers of *Ipson* are not intended to actually provide support between the upper and lower sheets.

Applicants note there are a number of evaluations required under Section 103. One highly relevant inquiry is "[t]he relationship between the problems which the inventor . . . was attempting to solve and the problem to which any prior art reference is directed." *Stanley Works v. McKinney Manufacturing Co.*, 520 F.Supp. 101, 216 U.S.P.Q. 298, 304 (D. Del. 1981). Thus, in analyzing the prior art under Section 103 of the Act, we must clearly comprehend the problem addressed by the present inventor and that must be compared or contrasted, as the case may be, with the problems addressed by the prior art.

Pursuing further the "problem" analyses required under Section 103 of the U.S. Patent Act, the applicability of any reference against the claims of a pending U.S. patent application requires compliance with *In re Gibbons*, 100 U.S.P.Q. 398, where it is stated that:

"In considering the question of invention, it is necessary to determine whether or not the art relied upon contains adequate directions for the practice of the invention without resort to the involved application."

The problem solved by providing support stems between the first and second flat panel dielectric barriers in the present invention is to withstand stresses presented when a pressure other than atmospheric pressure is introduced between the first and second flat panel dielectric barriers and to also provide a uniform radiant flux from the discharge space.

The applicant's disclosure teaches an entirely different arrangement of spacers from those of *Ipson*. Indeed, the applicant uses small support stems designed to provide mechanical stability between the first flat panel and the second flat panel. The spacers are small structures designed expressly to prevent segregating chambers from the overall structure, as demonstrated in Figure 4b of the present disclosure, shown above. Moreover, the spacer structure is expressly designed to occupy minimal area to ensure uniform radiant flux.

This feature of the present application is further exemplified in the submission of new claims 25-27, which have been submitted for examination on their merits, where these claims recite that the support stems are arranged in the discharge space between the dielectric barriers. In contrast, the spacers 5 in *Ipson* form and enclose the discharge channels 4 and are not located within the discharge space in the channels themselves. Accordingly, Applicant respectfully submit that claims 25-27 are

separately patentable over the cited prior art of record. Applicant respectfully submits that no new issues requiring further search and/or examination are raised by such amendments, as these features have already been considering during the prosecution of the present application.

Applicant submits that such adequate directions for coupling support stems to the first and second flat panel dielectric barriers are only found in the subject application and are not located anywhere within the *Ipson* reference. The purpose of positioning spacers between the upper and lower sheets in *Ipson* is merely to create separate discharge channels, where *Ipson* even states that the spacers are not required to be sealed to the upper and lower sheets. To the contrary, the discharge space between the first and second flat panel dielectric barriers in the present invention is a single discharge space that is not separated into multiple, separate discharge spaces by the stems. In this manner, one skilled in the art would not be motivated to combine the teachings of *Ipson* with those of *Eliasson*.

Accordingly, the combination of *Eliasson* and *Ipson* fails to teach or suggest a dielectric barrier discharge device having electrodes coupled to outside portions of the flat panel dielectric barriers and support stems coupled to both of the flat panel dielectric barriers that are positioned equidistantly from each other, as recited in independent claims 1 and 17. Applicant therefore submits that a *prima facie* case of obviousness cannot be sustained against independent claims 1 by combining *Ipson* and *Eliasson*.

According to the Manual of Patent Examining Procedure § 2142:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Applicant respectfully submits that the requirements for establishing an obviousness rejection cannot be sustained against the pending claims based upon the asserted combination of *Eliasson* and *Ipson*, as the asserted combination fails to teach a dielectric barrier discharge-driven light source in which a plurality of stems are equidistantly positioned between the flat panel dielectric

barriers. Applicant therefore respectfully requests withdrawal of the § 103 rejections of independent claims 1 and 17 and their respective dependent claims. Reconsideration is requested.

Applicant notes that, in order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art to combine reference teachings. MPEP § 2143.03. The applicant respectfully submits that there is no suggestion or motivation in *Ipson* and *Eliasson* to combine the teachings. Indeed, *Eliasson* teaches a DBD structure while *Ipson* fails to disclose a DBD structure, where the structural makeup of the respective disclosures disclose disparate apparatuses for accomplishing the transmission of light. Further, the structure in *Ipson* uses spacers to form separate discharge channels, wherein each channel contains a pair of electrodes in direct contact with a gas, similar to a florescent light source. Conversely, *Eliasson* discloses a DBD light source, where electrodes are positioned on the outside of the dielectric barriers and where the spacers are designed not to form discharge channels, but to support and maintain the distance between two dielectric barriers. Thus, because *Ipson* and *Eliasson* disclose alternate light types of light sources and also because the spacers cited in both *Ipson* and *Eliasson* are to be used for wholly different purposes, absent a suggestion for combining the references, the applicant respectfully submits that one skilled in the art would not be motivated to combine their teachings.

Applicant therefore respectfully submits that a *prima facie* case of obviousness cannot be maintained against the pending claims based on the combination of *Ipson* and *Eliasson*, and Applicant requests withdrawal of the § 103 rejections of independent claims 1 and 17 and their respective dependent claims. Reconsideration is respectfully requested.

The Office Action also rejected independent claim 23 under 35 U.S.C. §103(a) as being obvious over *Eliasson* in view of *Ipson*. Claim 23 is allowable because for at least the reasons stated above, namely that the combination of *Eliasson* and *Ipson* is improper as they are directed to disparate teachings. Because *Ipson* and *Eliasson* disclose alternate light types of light sources, absent a suggestion for combining the references, the applicant respectfully submits that these references should not be combined absent a suggestion of combining a florescent type light system with a DBD light system, or in the alternative, combining spacers designed to form disparate channels with

spacers designed to separate dielectric barriers. Accordingly, Applicant respectfully requests withdrawal of the rejection as to independent claim 23 and its respective dependent claims.

CONCLUSION

In each case, the pending rejections should be reconsidered in view of the amendments and remarks herein. Applicant believes that this case is in good condition for allowance, and a Notice of Allowance is earnestly solicited. If a telephone or further personal conference would be helpful, the Examiner is invited to call the undersigned, who will cooperate in any appropriate manner to advance prosecution. The Commissioner is directed and authorized to charge all additional required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 50-2638. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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